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Liao

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(54) **BULB STRUCTURE OF ASSEMBLING-TYPE CAR LAMP**

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H01J 5/50 (2006.01)

(52) **U.S. Cl.** **313/318.01**; 313/318.04; 313/318.09; 362/548; 362/649; 362/655

(58) **Field of Classification Search** 313/318.01; 362/548, 263, 216
See application file for complete search history.

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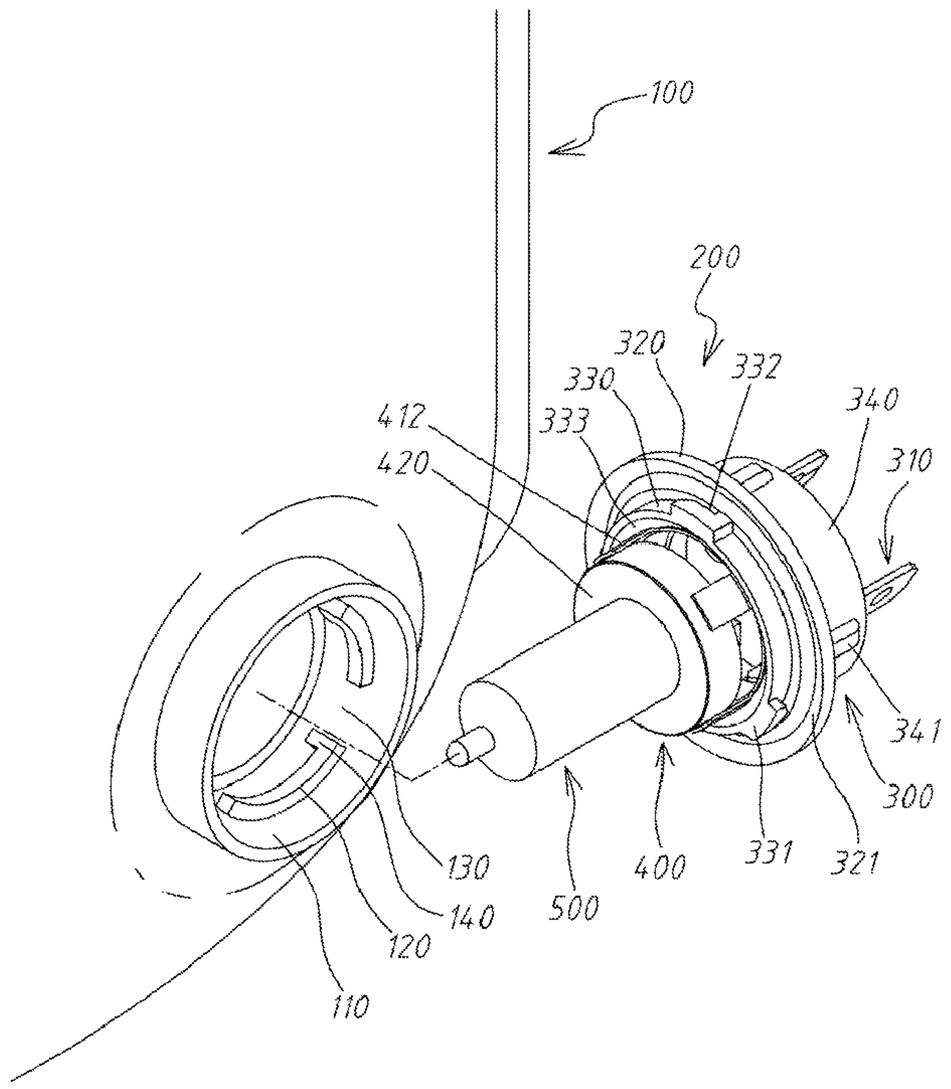
(57) **ABSTRACT**

A bulb structure of assembling-type car lamp includes a lamp housing and a bulb unit. The bulb unit includes a mounting base, a bulb holder, and a bulb. The mounting base includes electric pins, a forward raised seat, and a rearward protruded annular ring portion. The annular ring portion is externally provided with anti-slip ribs to facilitate easy turning and assembling of the bulb unit to the lamp housing. The bulb holder includes a holding seat and an adjusting seat connected to the mounting base and the bulb, respectively; and the bulb is electrically connected to the electric pins. By adjusting the adjusting seat relative to the holding seat, the bulb can be adjusted in position and focal length. A cover plate is closed to a rear open end of the annular ring portion to isolate joints of the bulb and the electric pins from external air, dust and water.

6 Claims, 7 Drawing Sheets



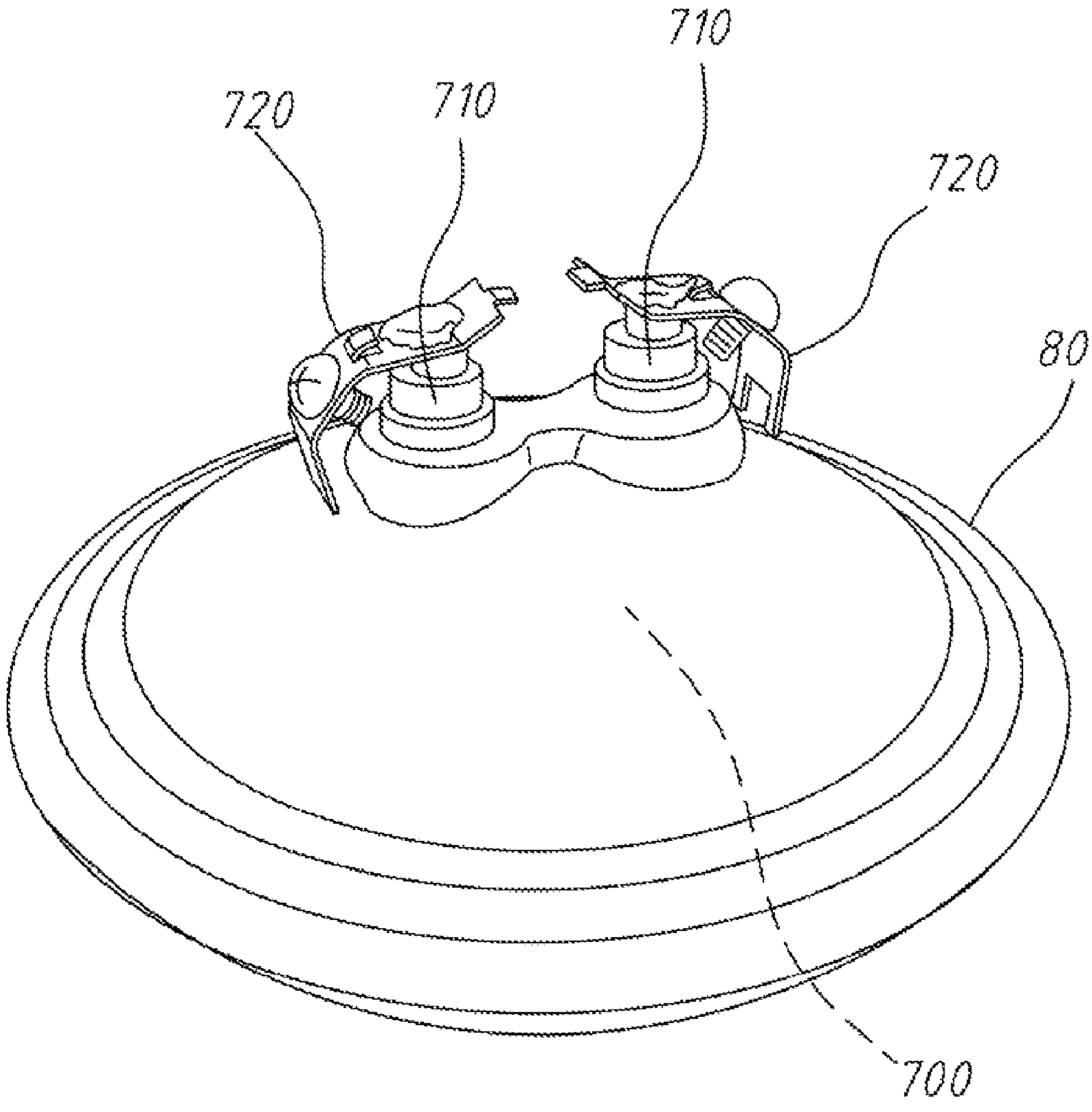


Fig. 1
(Prior Art)

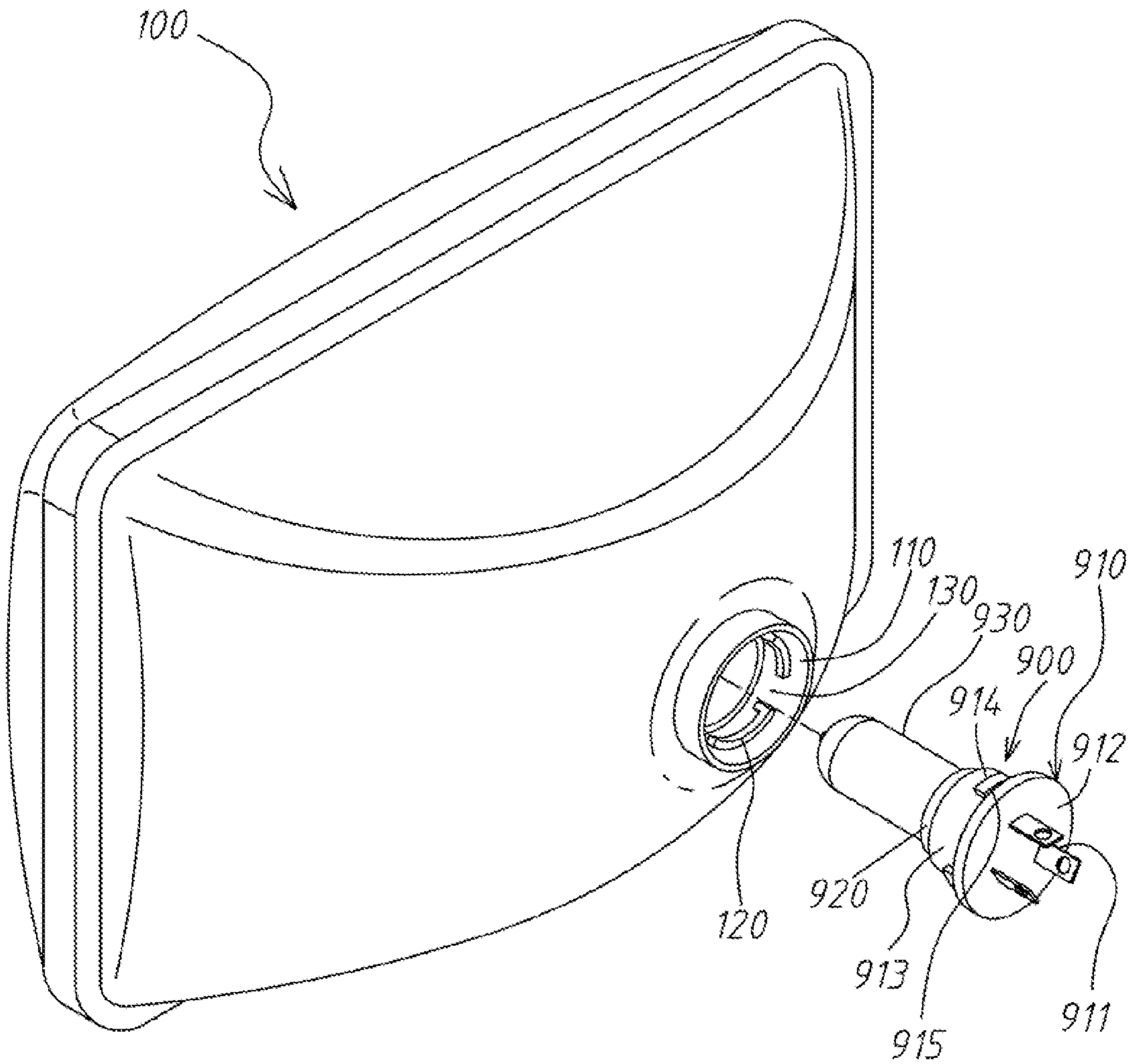
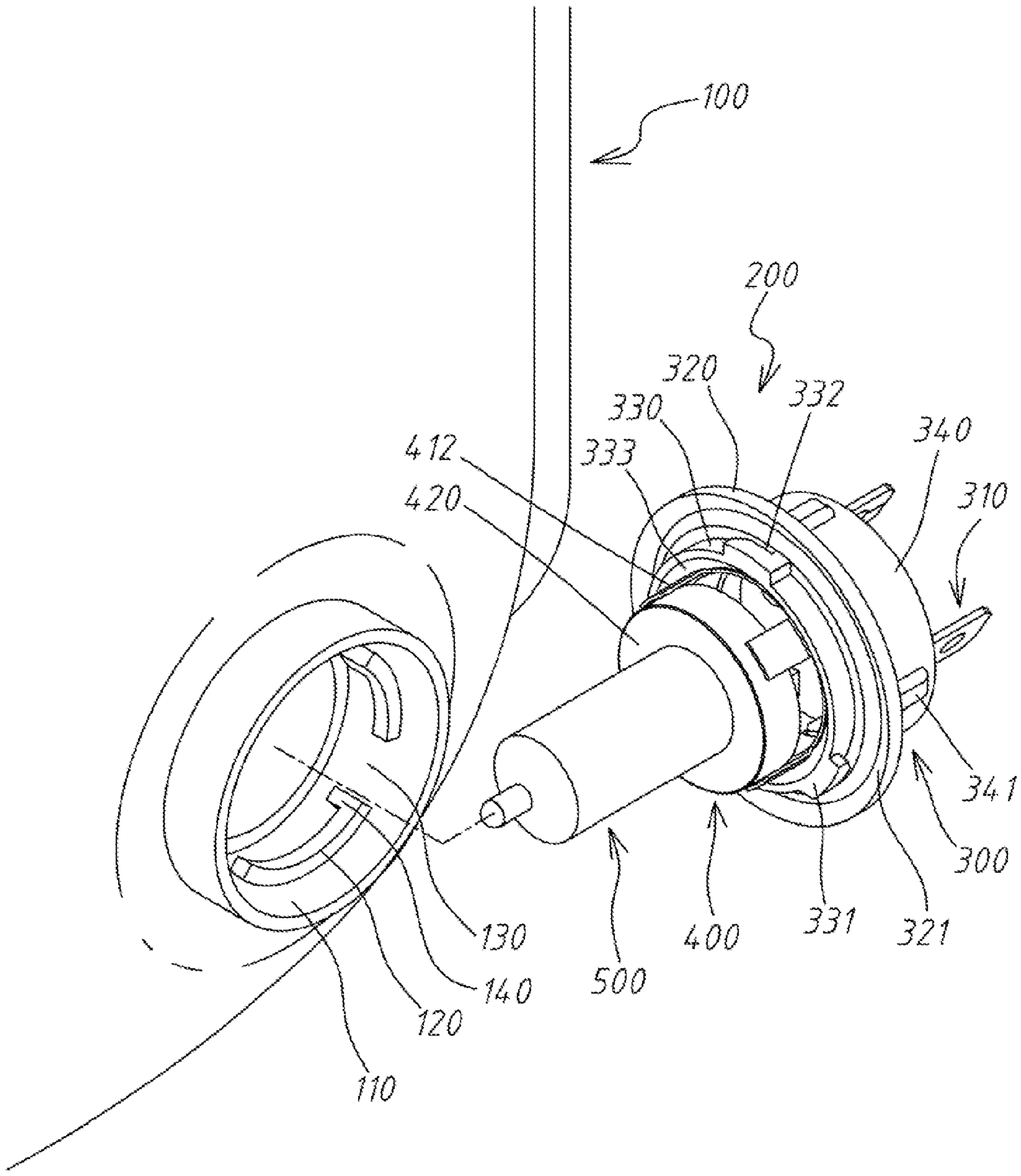


Fig. 2
(Prior Art)


100
200
320
330
332
340
412
333
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420
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300
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500
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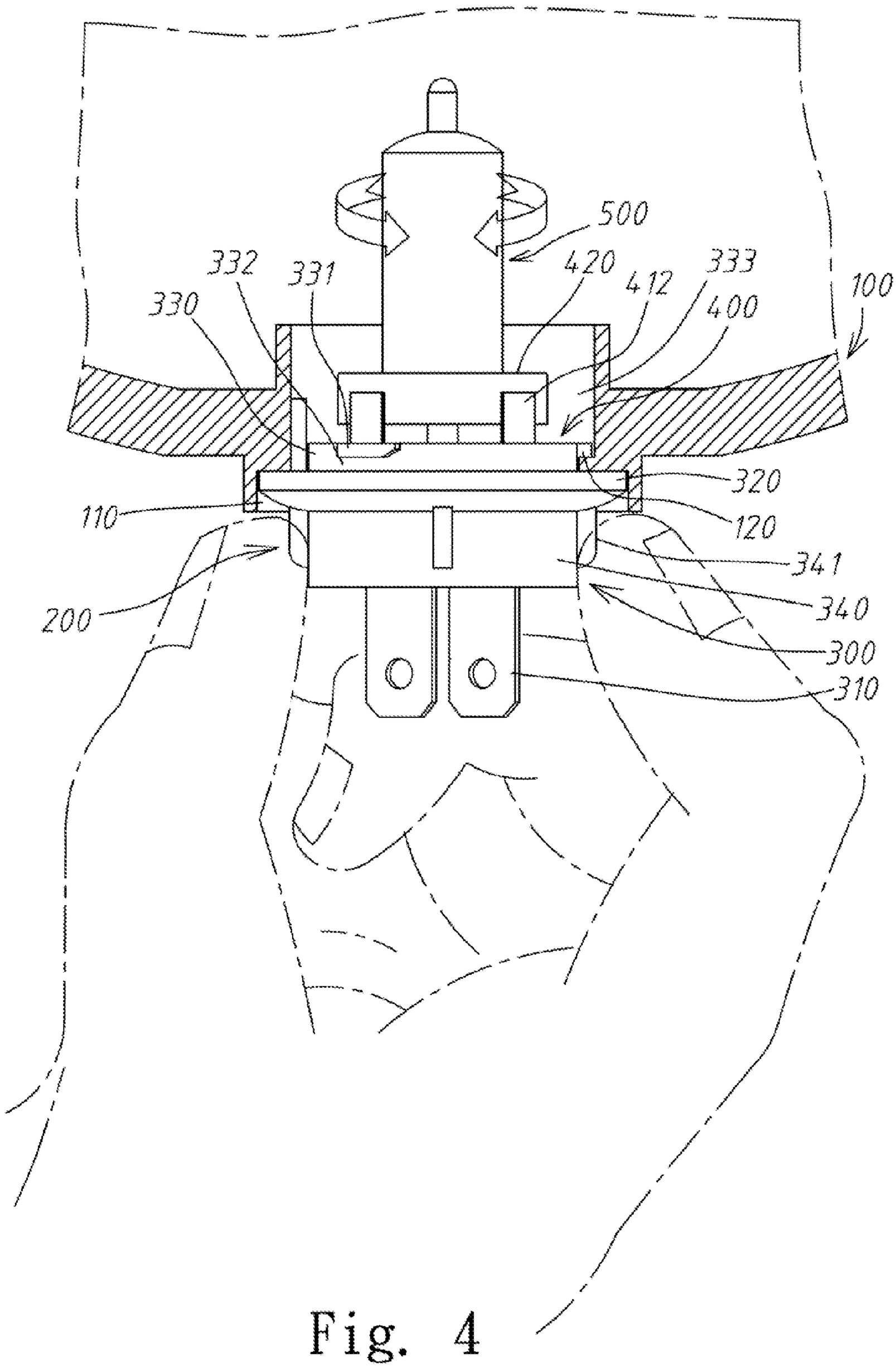
331
321
140
120
110

Fig. 3


500
420
412
333
400
332
331
330
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320
110
120
341
340
200
300
310

Fig. 4

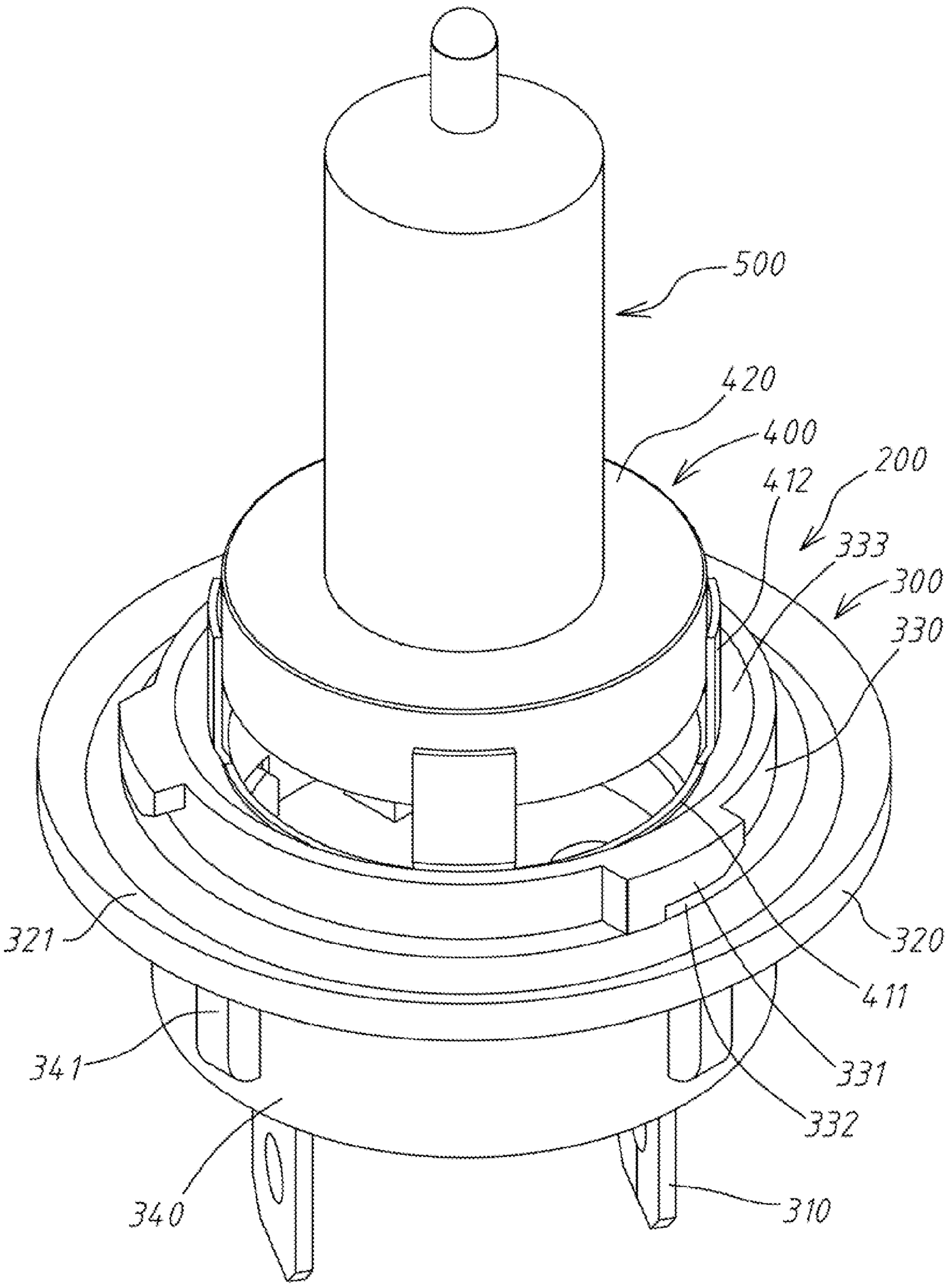
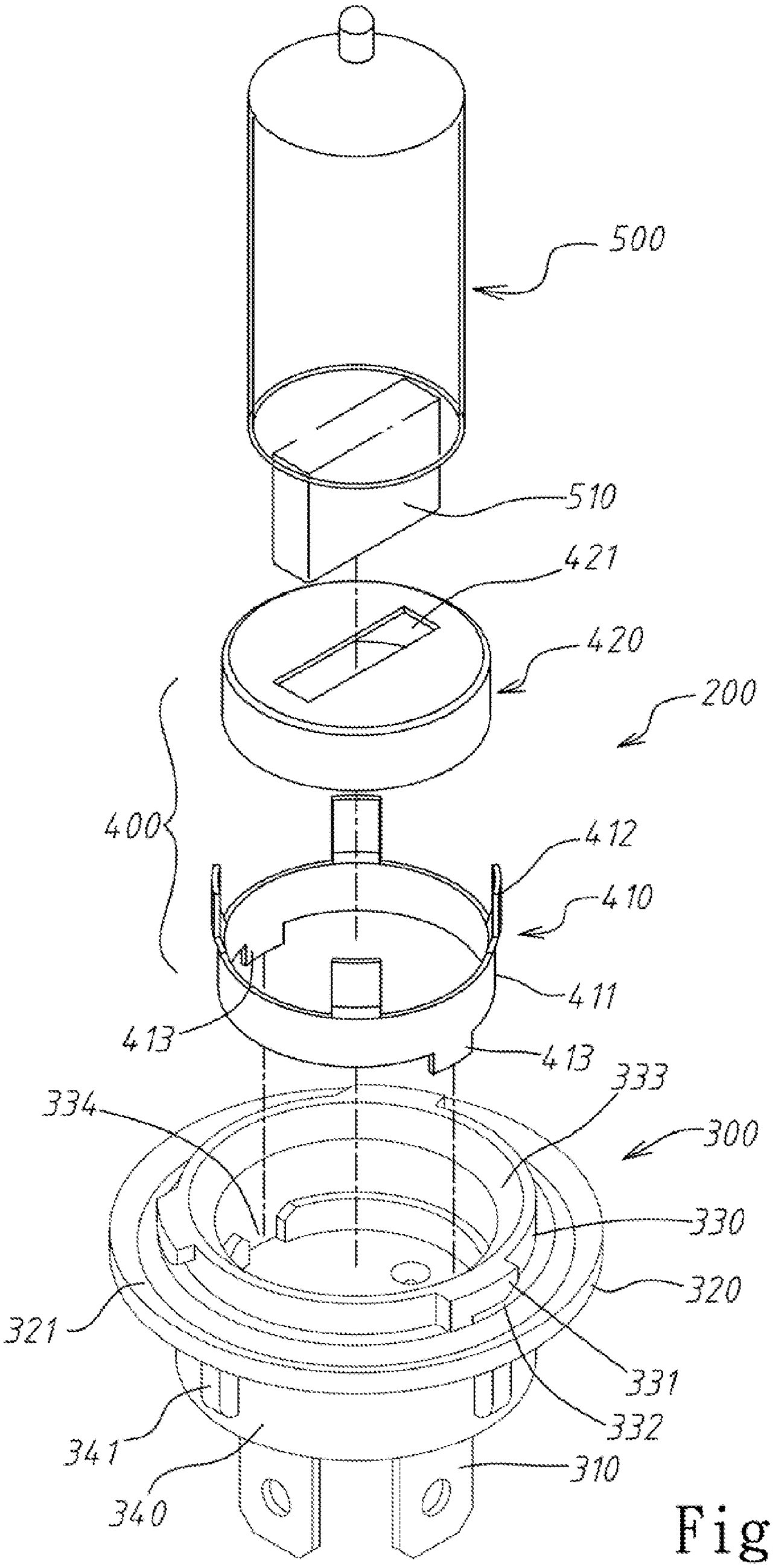


Fig. 5


500
510
421
420
200
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413
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333
334
300
330
320
321
331
332
341
310
340

Fig. 6

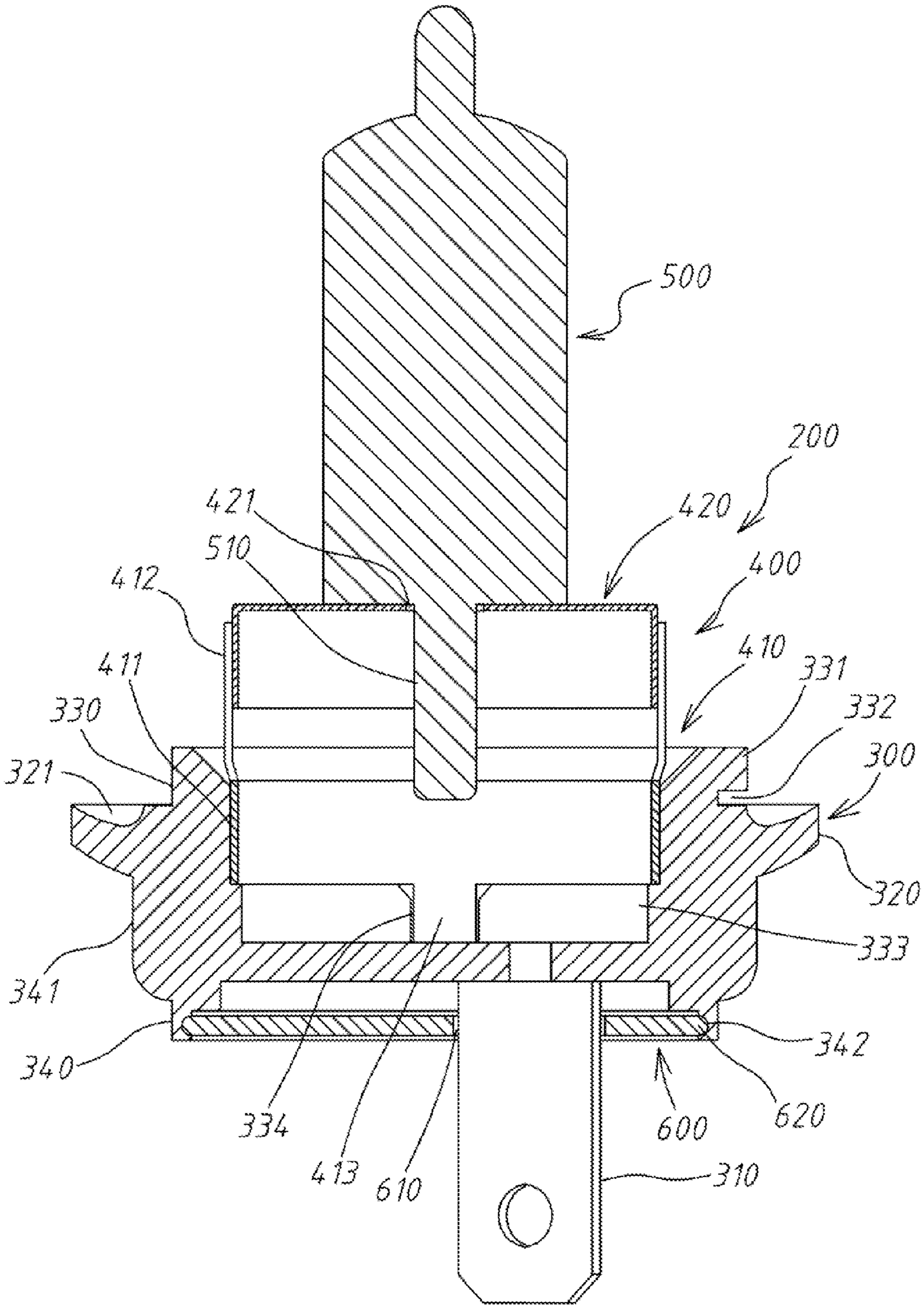
500
200
421
420
510
400
412
410
411
331
330
332
321
300
320
333
341
342
340
620
334
600
413
610
310

Fig. 7

BULB STRUCTURE OF ASSEMBLING-TYPE CAR LAMP

FIELD OF THE INVENTION

The present invention relates to a bulb structure, and more particularly to a bulb structure of assembling-type car lamp.

BACKGROUND OF THE INVENTION

FIG. **1** is a perspective view showing a conventional car lamp structure, which includes a bulb portion **700** and a lamp housing **800** that are integrally formed through sinter molding, such as a sinter-molded glass lamp housing, with two electric pins **710** of the bulb portion **700** rearward projected from the lamp housing **800**. Each of the electric pins **710** has a connecting strip **720** welded thereto for connecting with external wires (not shown).

The conventional integrally formed car lamp structure as shown in FIG. **1** has the following disadvantages in terms of its manufacture and use: (1) it is troublesome and inconvenient to integrally form the bulb portion **700** and the lamp housing **800** by way of sinter-molding; that is, the bulb portion **700** must be manufactured first, and then the lamp housing **800** and the bulb portion **700** are sintered together; the bulb portion **700** and the lamp housing **800** could not be independently mass-produced and then assembled to each other in a simple manner; and (2) the bulb portion **700** is not replaceable independently; that is, in the event the bulb portion **700** is damaged in the process of manufacturing or burned out while in use, the whole car lamp structure including the lamp housing **800** and the bulb portion **700** must be discarded at the same time to thereby cause waste in material and cost.

To overcome the disadvantages of the conventional integrally formed car lamp structure as shown in FIG. **1**, U.S. patent application Ser. No. 12/647,326 entitled "Assembling-type Car Lamp" was filed by the same applicant of the present invention. FIG. **2** is an exploded rear perspective view showing that the assembling-type car lamp disclosed in U.S. patent application Ser. No. 12/647,326 includes a lamp housing **100** and a bulb unit **900**. The lamp housing **100** is provided at a predetermined position with an assembling hole **110**. A plurality of ribs **120** are circumferentially extended and spaced along an inner wall surface of the assembling hole **110**, such that a notch **130** is formed between any two adjacent ribs **120**. The bulb unit **900** includes a mounting base **910**, a bulb holder **920**, and a bulb **930**. The mounting base **910** includes a plurality of electric pins **911**, an round plate **912**, and a raised seat **913** forward projected from the round plate **912**. The raised seat **913** is provided on an outer wall surface thereof with a plurality of circumferentially spaced guide blocks **914** located corresponding to the notches **130**, such that an annular space **915** is defined between the guide blocks **914** and the round plate **912**. The bulb **930** is mounted on the mounting base **910** via the bulb holder **920** and is electrically connected to the plurality of electric pins **911**. By aligning the guide blocks **914** on the bulb unit **900** with the notches **130** on the lamp housing **100** and fitting the bulb unit **900** in the assembling hole **110**, and then turning the bulb unit **900** for the ribs **120** on the lamp housing **100** to move into the annular space **915** on the bulb unit **900**, the bulb unit **900** can be conveniently assembled to the lamp housing **100** for use or for replacement.

However, the assembling-type car lamp disclosed in U.S. patent application Ser. No. 12/647,326 still has the following disadvantages in use: (1) to assemble or disassemble the bulb unit **900** to or from the lamp housing **100**, the bulb unit **900** is turned for the round plate **912** to tightly fit in or loosen from the assembling hole **110** on the lamp housing **100**. However, the bulb unit **900** is not provided thereon with any portion for a user to properly grip at in order to conveniently turn the bulb unit **900**; (2) the bulb **930** is fixedly mounted on the mounting base **910** via the bulb holder **920**, and the bulb **930** is fixed in position relative to the bulb holder **920**. Therefore, the bulb **930** is not adjustable in its position and focal length; and (3) joints between the bulb **930** and the electric pins **911** are exposed to an outer environment and therefore not dustproof, airtight and watertight.

SUMMARY OF THE INVENTION

It is therefore a primary object of the present invention to provide a bulb structure of assembling-type car lamp, which includes an easily turnable bulb unit.

Another object of the present invention is to provide a bulb structure of assembling-type car lamp, which allows a bulb thereof to be adjusted in position and focal length.

A further object of the present invention is to provide a bulb structure of assembling-type car lamp, which protects joints of a bulb and electric pins against external dust, air and water.

To achieve the above and other objects, the bulb structure of assembling-type car lamp according to an embodiment of the present invention includes a lamp housing and a bulb unit assembled to the lamp housing. The bulb unit includes a mounting base, a lamp holder, and a bulb. The mounting base has a plurality of electric pins, and includes a round plate, and a raised seat forward protruded from the round plate.

The bulb is mounted on the mounting base via the bulb holder to electrically connect to the electric pins. The bulb unit further includes an annular ring portion rearward protruded from one side of the round plate opposite to the raised seat. The annular ring portion is provided on an outer wall surface with a plurality of anti-slip ribs, and the electric pins are projected beyond the annular ring portion. When assembling or disassembling the bulb unit to or from the lamp housing, the rearward protruded annular ring portion and the anti-slip ribs provided thereon allow a user to comfortably grip at and easily turn the bulb unit.

According to an embodiment of the present invention, the bulb holder includes a holding seat and an adjusting seat connected to the holding seat, and the adjusting seat is position-adjustable relative to the holding seat to allow adjustment of the position and focal length of the bulb connected to the adjusting seat.

According to an embodiment of the present invention, the raised seat of the mounting base internally defines a receiving space, the holding seat of the bulb holder is fixedly received in the receiving space, and the bulb is fixedly connected to the adjusting seat, such that the holding seat and the adjusting seat are connected to the mounting base and the bulb, respectively.

According to an embodiment of the present invention, the holding seat has a ring body with a plurality of clamping plates spaced along a front edge of the ring body, and the adjusting seat is positioned in between the clamping plates and clamped in place by the clamping plate. Thus, the clamping plates form an adjusting and holding structure between the adjusting seat and the holding seat.

According to an embodiment of the present invention, the ring body of the holding seat further has at least one pair of spaced locating plates provided at a rear edge thereof, and the receiving space defined in the raised seat is provided on a peripheral wall thereof with at least one pair of locating slots

corresponding to the locating plates, such that the holding seat is fixedly received in the receiving space with the locating plates separately tightly inserted in the locating slots.

According to an embodiment of the present invention, the bulb has an insertion leg and is connected to the adjusting seat by securely inserting the insertion leg in an insertion hole formed on the adjusting seat.

According to an embodiment of the present invention, the bulb unit further includes a cover plate closed to a rear open end of the annular ring portion. The cover plate is provided with a plurality of through holes in a number and at positions corresponding to those of the electric pins, so that the electric pins are projected beyond the cover plate via the through holes. By closing the cover plate to the rear open end of the annular ring portion, joints of the bulb and the electric pins are isolated from external dust, air and water.

According to an embodiment of the present invention, the cover plate is provided along a circumferential outer wall surface with a radially protruded flange, and the annular ring portion is provided on an inner wall surface of the rear open end with an annular groove corresponding to the flange, so that the cover plate is closed to the annular ring portion with the flange clamped in the annular groove.

According to an embodiment of the present invention, the round plate is provided on the side having the raised seat with an annular recess, which is extended around an outer side of the raised seat and has a watertight adhesive filled therein, so that the bulb unit can be assembled to the lamp housing in an airtight and watertight manner.

According to an embodiment of the present invention, the lamp housing is provided at a predetermined position with an assembling hole, which is provided along an inner wall surface with a plurality of circumferentially extended and spaced ribs, such that a notch is formed between any two adjacent ribs; and the raised seat of the bulb unit is provided on an outer wall surface thereof with a plurality of circumferentially spaced guide blocks located corresponding to the notches on the lamp housing, such that an annular space is defined between the guide blocks and the round plate; and the ribs on the lamp housing can be moved into the annular space to assemble the bulb unit to the lamp housing.

BRIEF DESCRIPTION OF THE DRAWINGS

The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

FIG. **1** is a perspective view showing a conventional car lamp structure;

FIG. **2** is an exploded rear perspective view of a conventional assembling-type car lamp disclosed in U.S. patent application Ser. No. 12/647,326 filed by the same applicant of the present invention;

FIG. **3** is an exploded perspective view of a bulb structure of assembling-type car lamp according to an embodiment of the present invention;

FIG. **4** is an assembled partially sectioned side view of the bulb structure of assembling-type car lamp according to FIG. **3**, showing the manner of assembling a bulb unit to a lamp housing thereof;

FIG. **5** is an assembled perspective view of the bulb unit for the bulb structure of assembling-type car lamp according to FIG. **3**;

FIG. **6** is an exploded view of the bulb unit of FIG. **5**; and

FIG. **7** is a sectioned side view of the bulb unit of FIG. **5**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will now be described with a preferred embodiment thereof with reference to the accompanying drawings.

Please refer to FIGS. **3** and **4** that are an exploded perspective view and an assembled partially sectioned side view, respectively, of a bulb structure of assembling-type car lamp according to an embodiment of the present invention; to FIGS. **5** and **6** that are assembled and exploded perspective views, respectively, of a bulb unit for the bulb structure of assembling-type car lamp shown in FIG. **3**; and to FIG. **7** that is a sectioned side view of the bulb unit of FIG. **5**. As shown, the bulb structure of assembling-type car lamp according to an embodiment of the present invention includes a lamp housing **100** and a bulb unit **200**.

The lamp housing **100** can be made of, for example, a plastic material by molding, and has a reflecting layer (not shown) coated on a front wall surface thereof. Further, the lamp housing **100** is provided at a rear end portion with an assembling hole **110**, to which the bulb unit **200** is assembled.

A plurality of ribs **120** are circumferentially extended and spaced along an inner wall surface of the assembling hole **110**, such that a notch **130** is formed between any two adjacent ribs **120**. The notches **130** cooperate with related parts of the bulb unit **200** to assemble the bulb unit **200** to the lamp housing **100**. The ribs **120** are respectively provided at the same end with a sideward extended stop lug **140** oriented toward a front side of the lamp housing **100**.

The bulb unit **200** includes a mounting base **300**, a bulb holder **400**, and a bulb **500**.

The mounting base **300** is provided with a plurality of electric pins **310**, and includes a round plate **320** and a raised seat **330** forward projected from the round plate **320**. The raised seat **330** is provided on an outer wall surface thereof with a plurality of circumferentially spaced guide blocks **331** located corresponding to the notches **130** on the lamp housing **100**, such that an annular space **332** is defined between the guide blocks **331** and the round plate **320**. The raised seat **330** internally defines a receiving space **333**. An annular ring portion **340** is rearward protruded from one side of the round plate **320** opposite to the raised seat **330**, and a plurality of anti-slip ribs **341** are formed on an outer wall surface of the annular ring portion **340**. The electric pins **310** are rearward projected beyond the annular ring portion **340**.

The bulb holder **400** includes a holding seat **410** and an adjusting seat **420** held in the holding seat **410** in a position-adjustable manner. In implementing the present invention, the holding seat **410** includes a ring body **411** and a plurality of clamping plates **412** spaced along a front edge of the ring body **411**. The adjusting seat **420** is clamped in between the clamping plates **412**, and can be adjusted to a desired position relative to the clamping plates **412**. When the adjusting seat **420** has been adjusted to the desired position, it can be further welded to the clamping plate **412**. In this manner, the adjusting seat **420** can be fixed to the desired position to maintain a stable and secure connection of the adjusting seat **420** to the holding seat **410**. When the adjusting seat **420** is adjusted in its position relative to the holding seat **410**, the bulb **500** connected to the adjusting seat **420**, as will be described later, is also adjusted in position. That is, the bulb **500** can be adjusted in position and accordingly, the focal length thereof for the car lamp to reach an optimal operating state.

The holding seat **410** is fixedly received in the receiving space **333** defined in the mounting base **300**. In implementing the present invention, the ring body **411** of the holding seat **410** is provided on a rear edge with a pair of locating plates **413**, and the receiving space **333** is provided on a peripheral wall thereof with a pair of locating slots **334** corresponding to the locating plates **413**. The holding seat **410** is received in the receiving space **333** with the locating plates **413** separately tightly inserted in the locating slots **334**, so that the holding seat **410** is firmly held to the mounting base **300**.

The bulb **500** is fixedly connected to the adjusting seat **420**. In implementing the present invention, the adjusting seat **420** is provided with an insertion hole **421**, and the bulb **500** is provided with an insertion leg **510**. The bulb **500** is securely connected to the adjusting seat **420** by firmly inserting the insertion leg **510** in the insertion hole **421**. The bulb **500** also has a plurality of electric wires (not shown), which are extended through the round plate **320** to separately connect to the electric pins **310**. A waterproof adhesive (not shown) is further applied to joints of the electric wires and the electric pins **310**.

As can be seen in FIG. **7**, a cover plate **600** is closed to a rear open end of the annular ring portion **340** of mounting base **300**. The cover plate **600** is provided with a plurality of through holes **610** in a number and at positions corresponding to those of the electric pins **310**, so that the electric pins **310** are projected beyond the cover plate **600** via the through holes **610**. The cover plate **600** is provided on a circumferential outer wall surface with a radially protruded flange **620**, and the annular ring portion **340** is provided on an inner wall surface of the rear open end with an annular groove **342** corresponding to the flange **620**, so that the cover plate **600** is closed to the rear open end of the annular ring portion **340** with the flange **620** clamped in the annular groove **342**.

To assemble the bulb unit **200** to the lamp housing **100**, simply align the guide blocks **331** on the bulb unit **200** with the notches **130** in the assembling hole **110** on the lamp housing **100** and move the bulb unit **200** through the assembling hole **110**, and turn the bulb unit **200** for the ribs **120** in the assembling hole **110** to move into the annular space **332** between the round plate **320** and the guide blocks **331**. Then, the bulb unit **200** is further turned until the guide blocks **331** are abutted on the stop lugs **140**. At this point, the bulb unit **200** is exactly assembled to the lamp housing **100**. When it is desired to remove the bulb unit **200** from the lamp housing **100** or replace the bulb unit **200** with another one, simply turn the bulb unit **200** reversely to separate the bulb unit **200** from the lamp housing **100**. Therefore, the bulb unit **200** can be conveniently assembled to and disassembled from the lamp housing **100** for use or for replacement.

Further, the round plate **320** is provided on the side having the raised seat **330** with an annular recess **321**, which is extended around an outer side of the raised seat **330**. A watertight adhesive (not shown) is filled in the annular recess **321** to ensure an airtight and watertight assembling of the bulb unit **200** to the lamp housing **100**.

The bulb structure of assembling-type car lamp according to the present invention provides at least the following advantages: (1) the annular ring portion **340** is rearward protruded from the round plate **320** and the anti-slip ribs **341** are formed on the outer wall surface of the annular ring portion **340**, allowing a user to comfortably and stably grip at the annular ring portion **340** and turn the bulb unit **200** in an easy and convenient manner; (2) the bulb holder **400** includes the holding seat **410** and the adjusting seat **420**, allowing a user to adjust the bulb **500** to the desired position and focal length before the bulb **500** is finally fixedly held to the holding seat **410**; and (3) the cover plate **600** is provided to close the rear open end of the annular ring portion **340** on the mounting base **300**, preventing the joints of the bulb **500** and the electric pins **310** from exposing to the external environment and allowing the bulb unit **200** to be airtight, dustproof and watertight.

The present invention has been described with a preferred embodiment thereof and it is understood that many changes and modifications in the described embodiment can be carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims.

What is claimed is:

1. A bulb structure of assembling-type car lamp, comprising a lamp housing and a bulb unit assembled to the lamp housing; the bulb unit having a mounting base, a bulb holder, and a bulb; the mounting base being provided with a plurality of electric pins and including a round plate and a raised seat forward protruded from the round plate; the bulb being mounted on the mounting base via the bulb holder to electrically connect to the electric pins; the bulb unit further having an annular ring portion rearward protruded from one side of the round plate opposite to the raised seat; the annular ring portion being formed on an outer wall surface with a plurality of anti-slip ribs; and the electric pins being rearward projected beyond the annular ring portion, wherein the bulb holder includes a holding seat and an adjusting seat, and the adjusting seat being held in the holding seat in a position-adjustable manner, wherein the raised seat of the mounting base internally defining a receiving space, the holding seat of the bulb holder being fixedly received in the receiving space, and the bulb being fixedly connected to the adjusting seat, wherein the holding seat includes a ring body having a plurality of clamping plates spaced along a front edge thereof; and the adjusting seat being positioned in between the clamping plates and clamped in place by the clamping plates, wherein the ring body of the holding seat further has at least one pair of spaced locating plates provided at a rear edge thereof, and the receiving space defined in the raised seat is provided on a peripheral wall thereof with a pair of locating slots corresponding to the locating plates, and the holding seat being received in the receiving space with the locating plates separately tightly inserted in the locating slots, wherein the bulb unit further having a cover plate closed to a rear open end of the annular ring portion; and the cover plate being provided with a plurality of through holes in a number and at positions corresponding to those of the electric pins, so that the electric pins are projected beyond the cover plate via the through holes, wherein the cover plate is provided along a circumferential outer wall surface with a radially protruded flange, and the annular ring portion is provided on an inner wall surface of the rear open end with an annular groove corresponding to the flange.

2. The bulb structure of assembling-type car lamp as claimed in claim **1**, wherein the adjusting seat is provided with an insertion hole and the bulb is provided with an insertion leg; and the bulb being securely connected to the adjusting seat by firmly inserting the insertion leg in the insertion hole.

3. The bulb structure of assembling-type car lamp as claimed in claim **2**, wherein the lamp housing is provided at a predetermined position with an assembling hole; the assembling hole being provided along an inner wall surface thereof with a plurality of circumferentially extended and spaced ribs, such that a notch is formed between any two adjacent ribs; and the raised seat of the bulb unit being provided on an outer wall surface thereof with a plurality of circumferentially spaced guide blocks located corresponding to the notches on

the lamp housing, such that an annular space is defined between the guide blocks and the round plate; and the ribs on the lamp housing being able to move into the annular space to assemble the bulb unit to the lamp housing.

4. The bulb structure of assembling-type car lamp as claimed in claim **1**, wherein the round plate comprises an annular recess, and a watertight adhesive filled in the annular recess.

5. The bulb structure of assembling-type car lamp as claimed in claim **4**, wherein the lamp housing is provided at a predetermined position with an assembling hole; the assembling hole being provided along an inner wall surface thereof with a plurality of circumferentially extended and spaced ribs, such that a notch is formed between any two adjacent ribs; and the raised seat of the bulb unit being provided on an outer wall surface thereof with a plurality of circumferentially spaced guide blocks located corresponding to the notches on the lamp housing, such that an annular space is defined between the guide blocks and the round plate; and the ribs on the lamp housing being able to move into the annular space to assemble the bulb unit to the lamp housing.

6. The bulb structure of assembling-type car lamp as claimed in claim **1**, wherein the lamp housing is provided at a predetermined position with an assembling hole; the assembling hole being provided along an inner wall surface thereof with a plurality of circumferentially extended and spaced ribs, such that a notch is formed between any two adjacent ribs; and the raised seat of the bulb unit being provided on an outer wall surface thereof with a plurality of circumferentially spaced guide blocks located corresponding to the notches on the lamp housing, such that an annular space is defined between the guide blocks and the round plate; and the ribs on the lamp housing being able to move into the annular space to assemble the bulb unit to the lamp housing.

* * * * *